REMARKS

Applicants have now had an opportunity to carefully consider the comments set forth in the Office Action of May 17, 2006.

Reconsideration of the Application is requested.

The Office Action

Claims 25-27 and 29-35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,465,307 issued to Azumaya et al. (Azumaya) in view of U.S. Patent No. 5,978,791 issued to Farber et al. (Farber) and U.S. Patent No. 5,546,474 issued to Zuniga.

Claim 28 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Azumaya in view of Farber and Zuniga as applied to claim 25, and further in view of U.S. Patent No. 5,790,133 issued to Holcomb et al. (Holcomb).

Claims 36-40 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Azumaya in view of Zuniga.

Claim 41 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Azumaya in view of Zuniga and U.S. Patent No. 5,864,408 issued to Kumashiro.

Telephonic Interview

A telephonic interview was held with the Examiner on August 4, 2006. One of the subjects discussed related to the combination of the Zuniga reference with the Azumaya reference with particular reference to the §103 rejections of claims 25, 30 and 36. Reasons were provided by Applicants as to why these references cannot be properly combined because the embodiments described by Zuniga cannot be implemented in a two-pass processing such as described by Azumaya without destroying the advantages of the two-pass processing.

A second and final subject was the § 103 rejection of claims 25-27 and 29-35, particularly regarding whether or not the Azumaya reference describes identifying line segments. Reasons were submitted by Applicants to the effect that it does not. It was explained that it is Applicants' understanding that the only mentions of line segments in Azumaya are with reference to showing that the system correctly assigns area flags when a line segment crosses the marker (without identifying the segment itself). The remaining references in Azumaya are with reference to scan lines rather than line segments or lines within the image. Also, submitted reasons for believing that Figure

20 of Azumaya has been incorrectly interpreted in the Office Action and that the figure is not showing lines segments but, instead, is only showing data portions of scan lines while explaining a serial-to-parallel conversion device.

Although the Examiner was undecided about the merit of Applicants' above-mentioned arguments, the Examiner indicated that further consideration of the Applicants' arguments would be given when a formal response to the previous Office Action is received by the Examiner.

It is believed by Applicants that the discussion above reflects the substance of the interview.

The Art Rejections

Independent Claim 25 Patentable over Azumaya in View of Farber and Zuniga

With reference to independent claim 25 of the present application, the Office Action indicates that Azumaya in view of Farber discloses all of the limitations of claim 25, except that Azumaya in view of Farber does not disclose expressly automatically determining window regions in the image without user assistance by performing said first-pass processing. The Office Action then asserts that Zuniga discloses automatically determining window regions in the image without user assistance and that Azumaya in view of Farber is combinable with Zuniga because they are from the same field of endeavor. Applicants do not agree with the Office Action that Azumaya in view of Farber discloses all of the limitations of independent claim 25, except for automatically determining window regions, as explained in more detail below, Applicants also do not agree with the Office Action that Zuniga can be combined with Azumaya in view of Farber for several reasons. Firstly, Applicants intend to show that the references are not properly combinable because their intended function is destroyed, and secondly, Applicants intend to show that even if combined they do not teach or fairly suggest all claim limitations of claim 25.

It is worthwhile to note that the two-pass processing described by the present application as recited in the subject claim is a particular feature of the present application. For example, as described on page 5, lines 25-31, difficulties of the prior art are overcome by the use of an identifier equivalence table that is frequently updated during the first-pass processing of the document. For this reason, embodiments of the present application are well suited to applications involving high speed document processing. The first-pass processing of the document can be accomplished during the

scanning of the document because the described embodiments use only a two-line segment memory and do not associate line segments beyond the present scan line and the past scan line at any given time (page 15, lines 13-21). The second-pass processing can then continue during the inter-document delay processing to perform further analysis of the equivalence table formed during the first-pass processing (page 15, lines 22-26). The second-pass processing, having the entire document available, is thereby able to overcome any shortcomings of the two-line segment memory previously mentioned (page 15, lines 27-31).

Azumaya, Farber and Zuniga not Properly Combined

In section 4 of the present Office Action, it is asserted Azumaya discloses performing a first-pass processing. The Office Action then goes on to argue that Azumaya discloses, in the first-pass processing, the limitations set forth in claim 25 of the present application. The Office Action further asserts that Azumaya discloses performing a second-pass processing of the stored graphical representation of the image. In fact, the Office Action cites column 14, lines 28-34 and column 15, lines 43-50 of Azumaya in support of the assertion that Azumaya discloses performing a first-pass processing equivalent to the first-pass processing of the present application. Azumaya does disclose, in column 15, lines 42-44, that the described embodiment employs a line sequential process using the line image sensor. In this respect at least, Azumaya is similar to the present application. Applicants will show, however, that the embodiments described by Zuniga cannot be implemented in a two-pass processing as described by either Azumaya or the present application without destroying the advantageous first-pass processing which takes place during the line-by-line scanning of the document.

According to the abstract, Zuniga describes a method for classifying regions in a digital image as either photo regions or non-photo regions. The digital image as divided into regions and each region is further divided into a plurality of cells. As described in more detail in column 5, lines 45-51, features are extracted for all cells to determine the likelihood of each cell being a photo cell. The cells are labeled as either photo cells, non-photo cells, or are unclassified. However, it is important to note that, as described on lines 49-51, classified cells are used as seeds from which unclassified cells are grown. Further, it is important to note that Zuniga is describing a two-dimensional process on an already acquired digital image. Because the method described is a two-dimensional growing of cells, it is not suitable for a first-pass processing where an

image is being analyzed on a line-by-line basis because the line-by-line analysis is constrained to essentially to a single dimension, only examining the current scan line with respect to the previous scan line. To further illustrate this point, in one embodiment, Zuniga describes cell areas of 64 x 64 pixels which may be selected (column 5, lines 60-64). Further, as described in column 15, lines 14-17, the cells classified as photo cells or non-photo cells are used as seeds to start a region growing process, which is a two-dimensional process not suitable for line-by-line first-pass processing. In this regard, it should be noted that claim 25 of the present application clearly recites a limitation for "performing a first-pass processing of the image in a selected direction, the first-pass processing comprising the steps of: determining a first segment tag for a first line segment on a first line parallel to a first axis. Clearly, the combination of Zuniga with Azumaya would destroy the advantageous functionality of doing a first-pass line-by-line processing of the image because of the two-dimensional cell growing nature of the Zuniga patent. In other words, the Office Action does not show how Zuniga can be successfully transformed into a two-pass method for processing the image.

Complementary to the above, it can be argued that the combination of Azumaya with Zuniga would also destroy the intended function of Zuniga. For example, dividing the method taught by Zuniga into a first-pass and a second-pass processing would render the two dimensional cell growing nature of the Zuniga method undoable as described by Zuniga. In other words, there would be no point in having a first-pass processing of the image since the method described by Zuniga does not appear doable until the entire image is accumulated in memory.

Further, as is known, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated because 35 U.S.C. § 103 provides that the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made. Although the Zuniga method does not require user assistance, the Zuniga method cannot be combined with Azumaya in view of Farber to arrive at the first-pass and second-pass processing as recited in independent claim 25 as described above and, therefore, fails the requirement that all claim limitations must be considered.

Claim 25 Limitations not Taught Even if Combined

Although Applicants have contended, as described above, that Zuniga cannot be combined with Azumaya in view of Farber without destroying the intended function of

each, Applicants respectfully argue that the Office Action has not shown that Azumaya describes other limitations recited in the subject claim. For example, the Office Action asserts that Azumaya discloses that the first-pass processing comprises determining a first segment tag for a first line segment on a first line parallel to a first axis, with reference to Figure 21 and column 14, lines 21-25 of Azumaya. However, the AR flag of Azumaya is not described as a flag relevant or respective to a line segment, but is simply a signal of whether a particular part of the image is within the area as described in column 8, lines 43-46. In fact, Azumaya appears to be completely silent on the subject of identifying line segments.

The discussions in Azumaya with reference to lines appear to be referring either to scan lines of a document or to the effect a line has when crossing a marker, rather than to a detected line segment portion of the document. For example, as previously mentioned with reference to column 15, lines 42-45, Azumaya describes the embodiment as employing a line sequential process using the line image sensor. Azumaya describes a line memory in column 12, line 41 and an n-line memory in column 12, lines 58-59, however, Azumaya does not describe these line memories as memory for storing line segments of the image, but instead apparently uses these memories for storing full scan lines of the image in the main scan direction. The remaining discussions of image line segments in Azumaya appear to be with reference to Figures 28, 29 and 33-36. However, the relevant descriptions in Azumaya indicate that the exemplary lines shown are only for explaining the affects of a line crossing a marker portion. For example, with reference to Figures 28 and 29, the crossing portions are detected using the pixel patterns rather than the line segments shown (col. 18, lines 22-38). Again, for example, the discussion on column 25, line 21 through column 31, line 56 indicates that the exemplary lines are shown in Figures 33-36 only for explaining the affects of a line (701) crossing a marker portion (702). The discussion in Azumaya makes no mention of detecting the line segments 701, but rather only shows that the system correctly assigns area flags for portions of the image within the marker 702 and outside the marker 702.

Contrariwise, the recited segment tags for line segments in the subject claim (page 6, lines 17-23 of the present application) clearly describe that within each row of pixels, neighboring pixels having the same pixel tags are grouped into a line segment. And further, in lines 26-29, the specification describes how, similar to pixels, line segments have identifiers and tags. The line segment identifier matches the known

pixel identifiers of the pixels forming the line segment. Similarly, the line segment tag matches the pixel tags of the pixels forming the line segment. While the AR flags of Azumaya may be considered roughly equivalent to the pixel tags of the present application in the respect that they relate to a pixel or an area of the image, Azumaya does not suggest or describe any similar tag for line segments. Exemplary line segments of the present application are also shown in Figure 1 and discussed in the recited section of the present application where, for example, a first line segment 60 is comprised of white pixels, a second line segment 70 is comprised of black pixels, and a third line segment 80 is comprised of white pixels. Azumaya neither teaches or suggests such line segment identification in the images.

Further, although Zuniga describes identifying areas of the image which contain line art, Zuniga does not suggest or describe identifying individual line segments nor applying a tag to such individual line segments. Additionally, Farber is completely silent on the subject of detecting areas within images and, therefore, the combination of Azumaya, Farber, and Zuniga neither teaches nor suggests the recited limitations of claim 25 with regard to line segments and line segment tags.

Claim 26 is Distinguished

With reference now to claim 26, the Office Action asserts that Azumaya discloses the recited limitation of determining a location of a third line segment by identifying said third line segment on one of said first line and said second line, as contiguous with one of the group of said first line segment and said second line segment extending a lesser distance in a first direction along said first axis such that said third line segment overlaps a position of the other of said group of said first line segment and said second line segment along said first axis. However, the Office Action is entirely erroneous in referring to the images shown in Figure 20 (580) as a line segment, and more particularly , the Office Action is erroneous in referring to reference numeral 580 as depicting a third segment contiguous with the second line segment.

Figure 19 is an explanatory diagram for explaining the operation of the SP converting device 64 (serial-to-parallel converting device [col. 8, lines 29-31]) shown in Figure 18. The blocks shown in the Figures do not represent lines or line segments, but rather data of a scan line, whether that data be all zeros, all ones, or a mixture. For example: "In the SP converting device 64, the serial data ((a) of FIG. 19) of a preset number of pixels ((b) of FIG. 19) are first stored into the 1-block memory 551. Thereafter, storing of the serial data into the 2-block memory 552 starts as shown in (c)

of FIG. 19. A similar storing operation is repeated till the 4th block data as shown in (e) of FIG. 19. Afterwards, the data thus stored are read out of the memories 551 to 554 as shown in (f) to (i) of FIG. 19" (col. 14, lines 56-61). The reference numeral 580 refers only to data which happens to be processed twice, i.e. the same data rather than different pieces of contiguous data. Azumaya makes this very clear: "In this embodiment, the data in the vicinity of the boundary between the adjacent blocks are processed in the processings of both the blocks. For this reason, the same data are stored in the block memories of both the blocks" (col. 14, lines 1-4). Further: "Reference numeral 580 designates the data where the first and second block data overlap" (col. 14, lines 11-12). Azumaya does not refer to the data as line segments, but only as data obtained from scan lines, e.g., "n-th line" and "(n+1)th" line.

With reference now to claims 27 and 29, for the same reasons as set forth with reference to claims 25-26, Azumaya does not teach or suggest detecting line segments. Therefore, because each of the subject claims recite limitations regarding "line segments", claims 27-29 are patentably distinct over the cited reference.

For the reasons set forth above, Applicants respectfully submit that independent claim 25, and claims 26-29 and 42 depending therefrom are patentably distinct over the cited references and are in condition for allowance.

Independent Claim 30 Patentable over Azumaya in View of Farber and Zuniga

With reference now to independent claim 30, Applicants contend for the same reasons set forth with reference to claim 25 that that Zuniga cannot be combined with Azumaya without destroying the intended function of each. However, as with claim 25, Applicants respectfully again argue that the Office Action has not shown that Azumaya describes other limitations recited in the subject claim. For example, claim 30 recites a limitation for a memory adapted to store at least one of the group of a first identifier of a first line segment on a first line and a second identifier of a second line segment on a second line and storing the image in a page storage buffer portion of the memory." Further, claim 30 recites a limitation for a processor adapted to "automatically determine window regions in the image without user assistance by, in a first-pass processing while the image is being received, forming and frequently updating an identifier equivalence table by comparing said first identifier to said second identifier, determining a first segment tag for said first line segment, determining that said first line segment is eligible for a base identifier search if said first identifier does not equal said second identifier and conducting a base identifier search for said first line segment..." and

"wherein said first line and said second line are parallel to a first axis and said first line segment overlaps said second line segment". As argued above with reference to claim 25, however, Azumaya appears to be completely silent on the subject of identifying line segments.

As previously mentioned, the discussions in Azumaya with reference to lines appear to be referring either to scan lines of a document or to the effect a line has when crossing a marker, rather than to a detected line segment portion of the document. For example, as previously mentioned with reference to column 15, lines 42-45, Azumaya describes the embodiment as employing a line sequential process using the line image sensor. Azumaya describes a line memory in column 12, line 41 and an n-line memory in column 12, lines 58-59, however, Azumaya does not describe these line memories as memory for storing line segments of the image, but instead apparently uses these memories for storing full scan lines of the image in the main scan direction. The remaining discussions of image line segments in Azumaya appear to be with reference to Figures 28, 29 and 33-36. However, the relevant descriptions in Azumaya indicate that the exemplary lines shown are only for explaining the affects of a line crossing a marker portion. For example, with reference to Figures 28 and 29, the crossing portions are detected using the pixel patterns rather than the line segments shown (col. 18, lines 22-38). Again, for example, the discussion on column 25, line 21 through column 31, line 56 indicates that the exemplary lines are shown in Figures 33-36 only for explaining the affects of a line (701) crossing a marker portion (702). The discussion in Azumaya makes no mention of detecting the line segments 701, but rather only shows that the system correctly assigns area flags for portions of the image within the marker 702 and outside the marker 702.

Contrariwise, the recited segment tags for line segments in the subject claim (page 6, lines 17-23 of the present application) clearly describe that within each row of pixels, neighboring pixels having the same pixel tags are grouped into a line segment. And further, in lines 26-29, the specification describes how, similar to pixels, line segments have identifiers and tags. The line segment identifier matches the known pixel identifiers of the pixels forming the line segment. Similarly, the line segment tag matches the pixel tags of the pixels forming the line segment. While the AR flags of Azumaya may be considered roughly equivalent to the pixel tags of the present application in the respect that they relate to a pixel or an area of the image, Azumaya does not suggest or describe any similar tag for line segments. Exemplary line

segments of the present application are also shown in Figure 1 and discussed in the recited section of the present application where, for example, a first line segment 60 is comprised of white pixels, a second line segment 70 is comprised of black pixels, and a third line segment 80 is comprised of white pixels. Azumaya neither teaches nor suggests such line segment identification in the images.

Further, although Zuniga describes identifying areas of the image which contain line art, Zuniga does not suggest or describe identifying individual line segments nor applying a tag to such individual line segments. Additionally, Farber is completely silent on the subject of detecting areas within images and, therefore, the combination of Azumaya, Farber, and Zuniga neither teaches nor suggests the recited limitations of claim 30 with regard to line segments and line segment tags.

With reference now to claims 33-35, for the same reasons as set forth with reference to claim 30, Azumaya does not teach or suggest detecting line segments. Therefore, because each of the subject claims recite limitations regarding "line segments", claims 33-35 are patentably distinct over the cited reference.

For the reasons set forth above, Applicants respectfully submit that independent claim 30, and claims 31-35 and 43 depending therefrom are patentably distinct over the cited references and are in condition for allowance.

Independent Claim 36 Patentable over Azumaya in View of Zuniga

With reference now to independent claim 36, Applicants contend for the same reasons set forth with reference to claim 25 that that Zuniga cannot be combined with Azumaya without destroying the intended function of each. However, as with claim 25, Applicants respectfully again argue that the Office Action has not shown that Azumaya describes other limitations recited in the subject claim. For example, claim 36 recites a limitation for "forming line segments of neighboring pixels of said first row having common pixel identifiers." As argued above with reference to claim 25, however, as previously discussed, Azumaya appears to be completely silent on the subject of identifying line segments.

Again as previously mentioned, the discussions in Azumaya with reference to lines appear to be referring either to scan lines of a document or to the effect a line has when crossing a marker, rather than to a detected line segment portion of the document. For example, as previously mentioned with reference to column 15, lines 42-45, Azumaya describes the embodiment as employing a line sequential process using the line image sensor. Azumaya describes a line memory in column 12, line 41

and an n-line memory in column 12, lines 58-59, however, Azumaya does not describe these line memories as memory for storing line segments of the image, but instead apparently uses these memories for storing full scan lines of the image in the main scan direction. The remaining discussions of image line segments in Azumaya appear to be with reference to Figures 28, 29 and 33-36. However, the relevant descriptions in Azumaya indicate that the exemplary lines shown are only for explaining the affects of a line crossing a marker portion. For example, with reference to Figures 28 and 29, the crossing portions are detected using the pixel patterns rather than the line segments shown (col. 18, lines 22-38). Again, for example, the discussion on column 25, line 21 through column 31, line 56 indicates that the exemplary lines are shown in Figures 33-36 only for explaining the affects of a line (701) crossing a marker portion (702). The discussion in Azumaya makes no mention of detecting the line segments 701, but rather only shows that the system correctly assigns area flags for portions of the image within the marker 702 and outside the marker 702.

Contrariwise, the recited segment tags for line segments in the subject claim (page 6, lines 17-23 of the present application) clearly describe that within each row of pixels, neighboring pixels having the same pixel tags are grouped into a line segment. And further, in lines 26-29, the specification describes how, similar to pixels, line segments have identifiers and tags. The line segment identifier matches the known pixel identifiers of the pixels forming the line segment. Similarly, the line segment tag matches the pixel tags of the pixels forming the line segment. While the AR flags of Azumaya may be considered roughly equivalent to the pixel tags of the present application in the respect that they relate to a pixel or an area of the image, Azumaya does not suggest or describe any similar tag for line segments. Exemplary line segments of the present application are also shown in Figure 1 and discussed in the recited section of the present application where, for example, a first line segment 60 is comprised of white pixels, a second line segment 70 is comprised of black pixels, and a third line segment 80 is comprised of white pixels. Azumaya neither teaches or suggests such line segment identification in the images.

Further, although Zuniga describes identifying areas of the image which contain line art, Zuniga does not suggest or describe identifying individual line segments. Therefore, the combination of Azumaya and Zuniga neither teaches nor suggests the recited limitations of claim 36 with regard to line segments.

With reference now to claims 38-41, for the same reasons as set forth with

reference to claim 36, Azumaya does not teach or suggest detecting line segments. Therefore, because each of the subject claims recite limitations regarding "line segments", claims 38-41 are patentably distinct over the cited reference.

For the reasons set forth above, Applicants respectfully submit that independent claim 36, and claims 36-41 depending therefrom are patentably distinct over the cited references and are in condition for allowance.

CONCLUSION

For the reasons detailed above, it is submitted all claims remaining in the application (Claims 25-43) are now in condition for allowance. The foregoing comments do not require unnecessary additional search or examination.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call Mark Svat, at Telephone Number (216) 861-5582.

Respectfully submitted,

FAY, SHARPE, FAGAN,
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Aug 15th, 2006
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CERTIFICATE OF MAILING

I certify that this Amendment C and accompanying documents are being deposited with the United States Postal Service as First Class mail under 37 C.F.R. § 1.8 and addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

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Date: **August 15, 2006**	Printed Name: **Kathleen A. Nimrichter**

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